

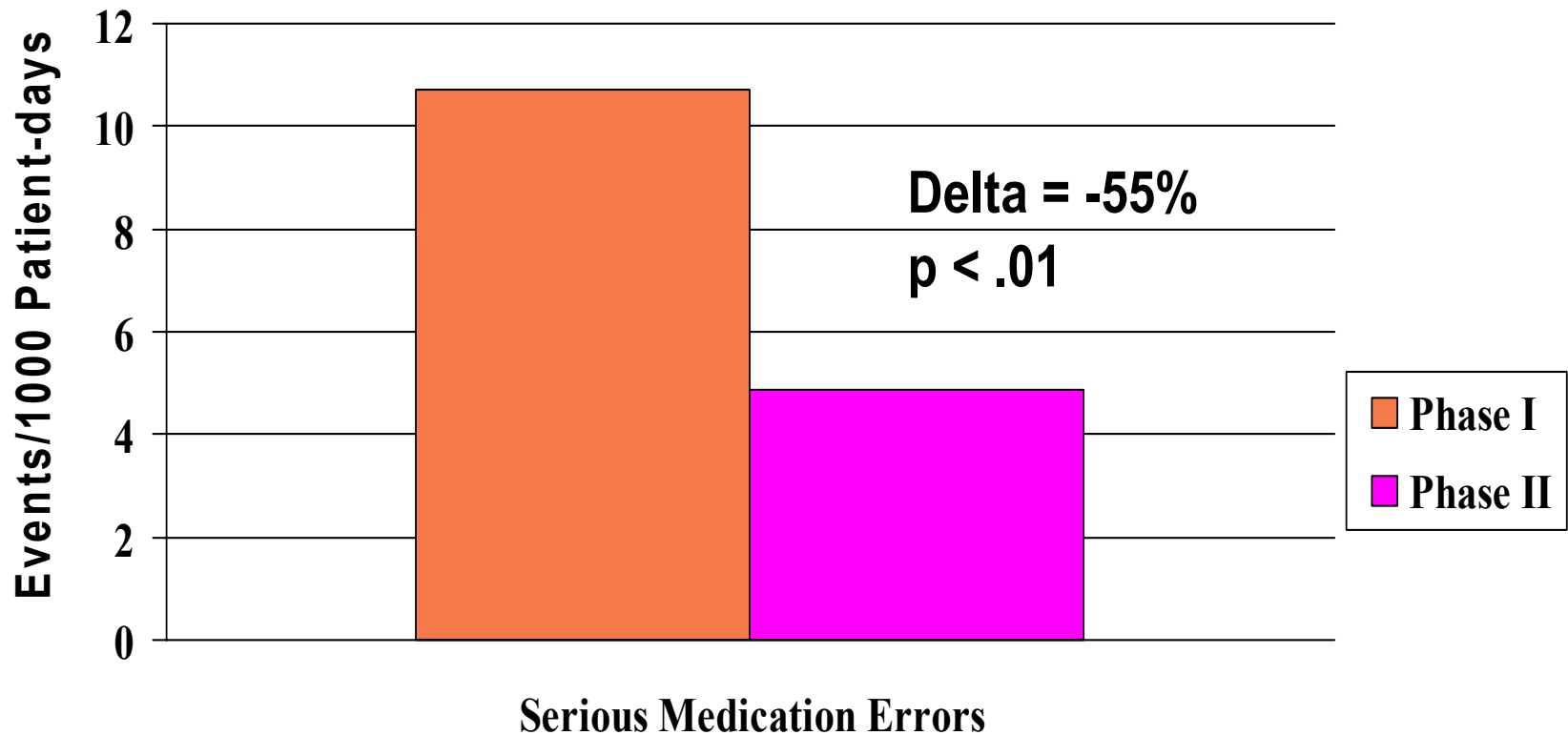
# Incentives, Risks and Benefits

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**John P. Glaser, PhD**  
**Vice President and CIO**  
**Partners HealthCare System**

**March 11, 2002**

# Serious Medication Error Rates Before and After OE



*Bates et al, JAMA, 1998*

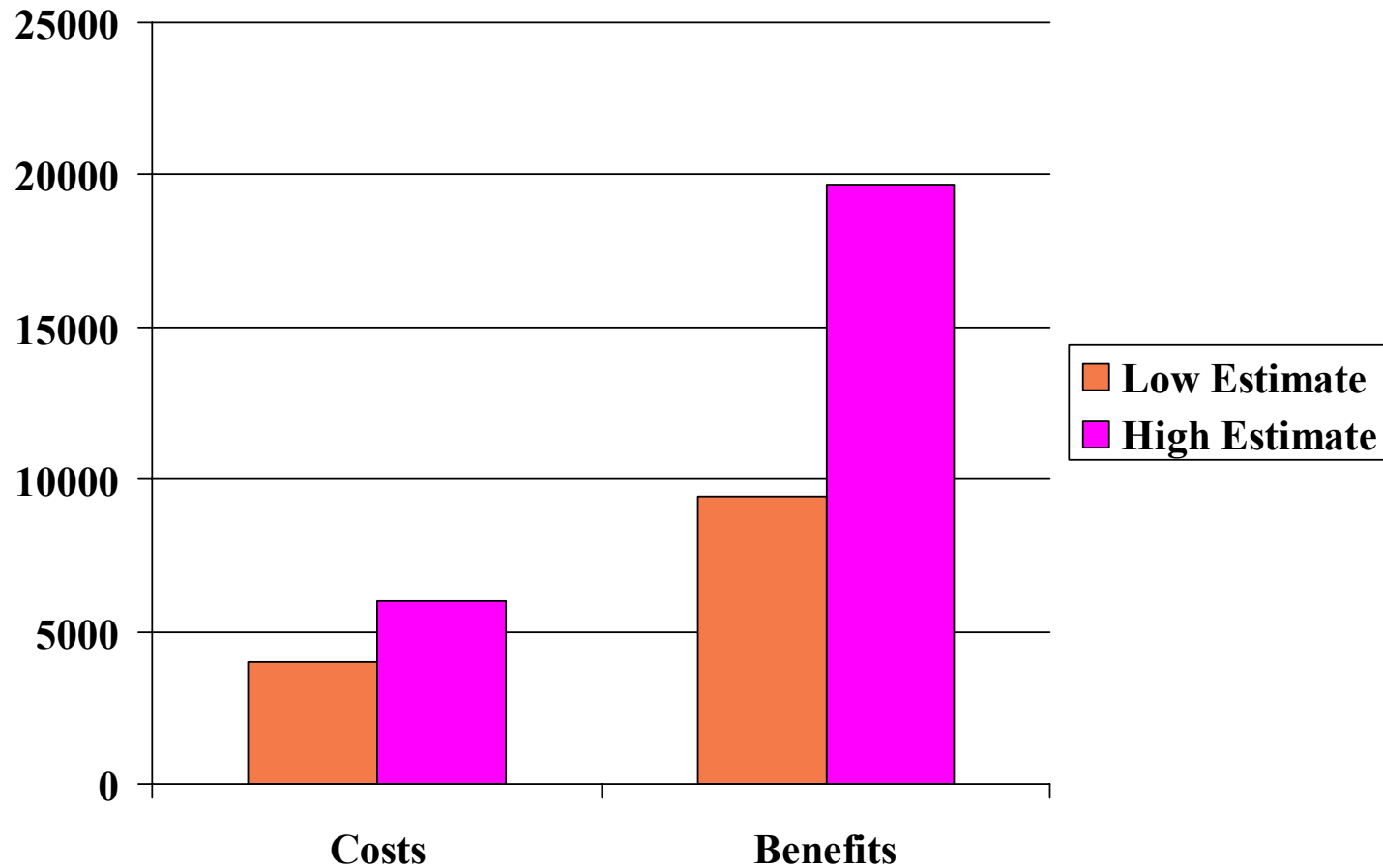
# Impact of BWH Inpatient Provider Order Entry

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- ◆ Nizatidine use, for all oral H2 blocker orders, increased from 12% to 81%
- ◆ The percent of doses over the suggested maximum decreased from 2% to .6%
- ◆ The percent of orders for Ondansetron, with a frequency of 3 times daily, increased from 6% to 75%
- ◆ The percent of bed rest orders with a consequent order of heparin increased from 24% to 54%

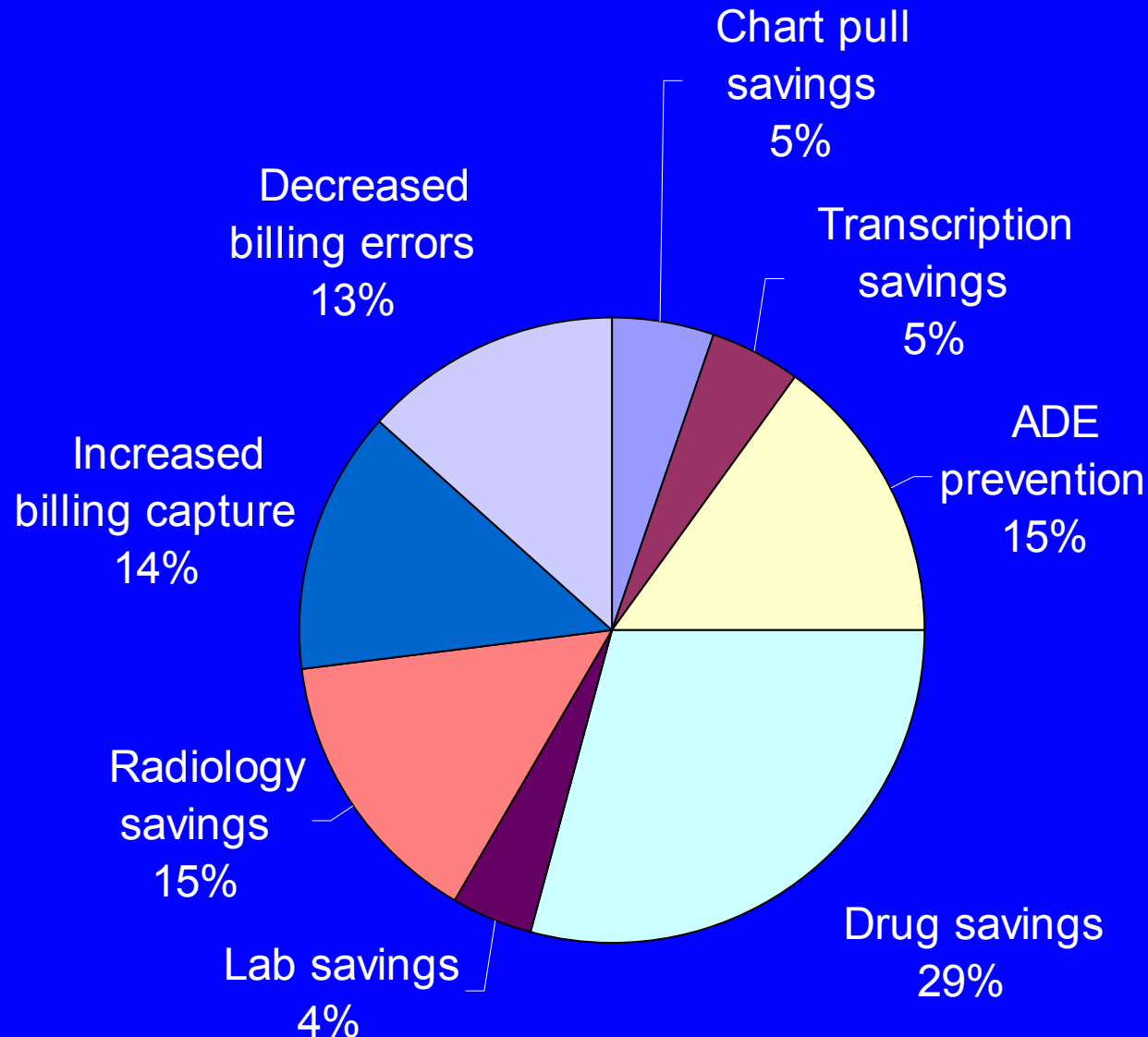
# Costs of LMR vs. Benefits

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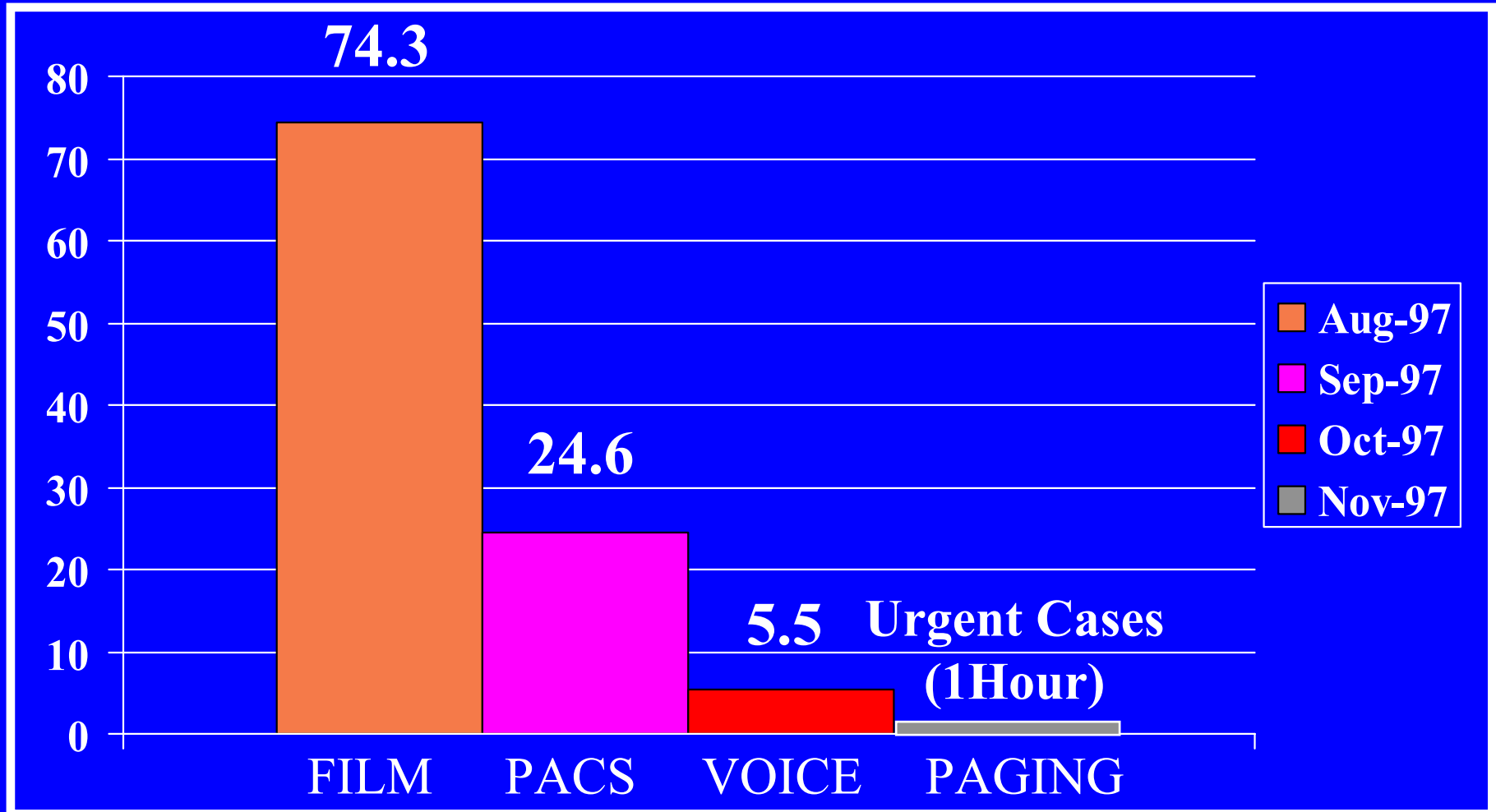


# LMR Benefits

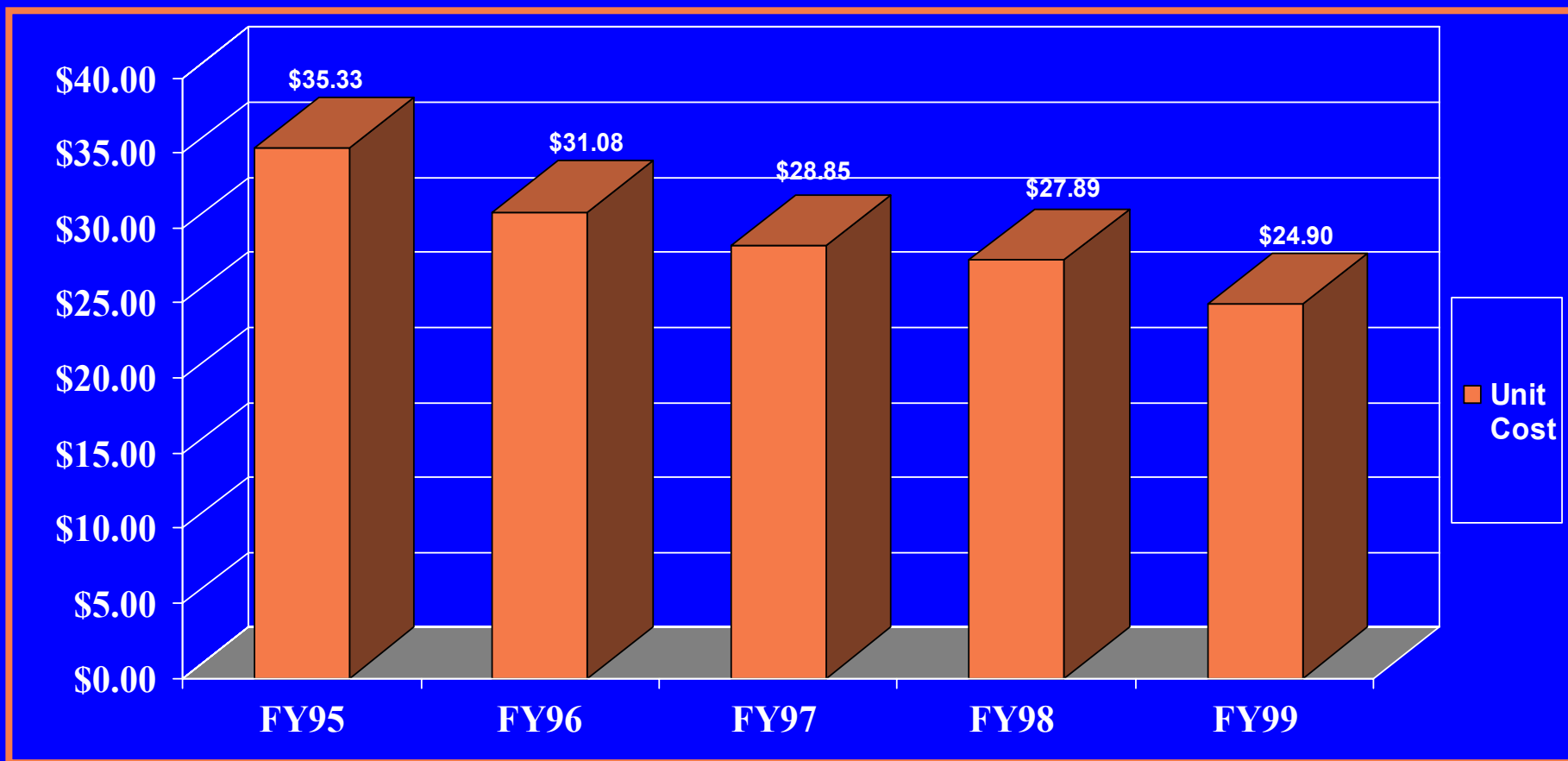
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# *Report Turnaround at Health Centers Voice Recognition and PACs*

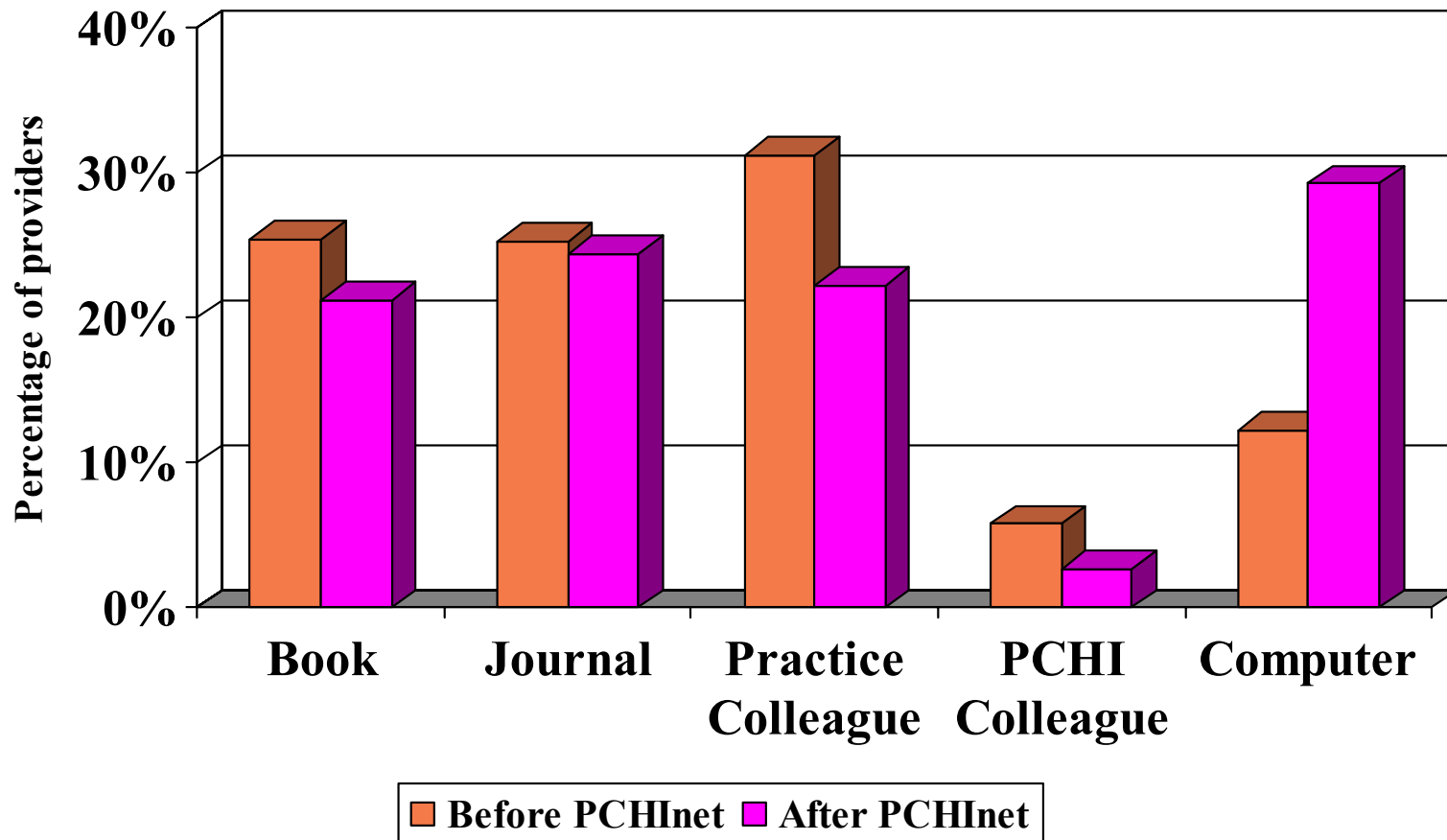


# *Combined Technology - Unit Cost Saving*



# PCHI-net Impact: Access to Knowledge Resources

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# **Survey of Physician's Experience Using a Handheld Reference Guide**

**Rothschild AMIA Proc 2000**

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- ◆ **Survey of physicians using qRx (ePocrates) on a Palm**
- ◆ **60% used qRx more than twice a day**
- ◆ **88% report more than 3/4 of questions addressed**
- ◆ **81% report improved drug-related decisions**
- ◆ **46% report 3 or more drug decisions per week were affected**
- ◆ **50% report 1 or more preventable adverse drug events were avoided per week**
- ◆ **Overall efficiency improved in inpatient (71%) and outpatient (69%) practice**

# Telemedicine Trial Results

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## Teledermatology

- ◆ Dermatologists are at least 3 times as efficient providing teleconsultations as they are in the office
- ◆ Supporting evidence from patients
  - Achieved symptom relieve twice as fast with teledermatology consult
  - Scored 4.6 (1-5) on comfort with teledermatology process

## eConsults

- ◆ Diagnosis changed in 15% of cases
- ◆ Treatment plan changed in 71% of cases

# **Patient-Specific Computerized Outpatient Reminders to Improve Physician Compliance with Clinical Guidelines**

## **Karson AMIA Proc**

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### **◆ Diabetic patients**

- Received overdue HbA1C studies (60% vs. 46%)
- Cholesterol studies (39% vs. 20%)
- Eye exams (17% vs. 10%)
- Nursing visits (3.1% vs. 1.4%)

### **◆ Diabetic hypertensives were started on ACEIs more frequently (14% vs 8%)**

### **◆ Reminders lead to switching to lower cost alternatives**

- ACEI (4.9% vs. 2.7%)
- Statins (7.3% vs. 4.4%)
- H2-Blockers (5.4% vs. .8%)

**New Pt - Web Site**

**Info for Pt**

- Directions & Appt
- What to expect
- Info about them
- Registration
- Demographic Info
- Hx - FH, etc
- Consents
- MD bio-sketches

**Monitoring - Data Input**

**Clinicians**

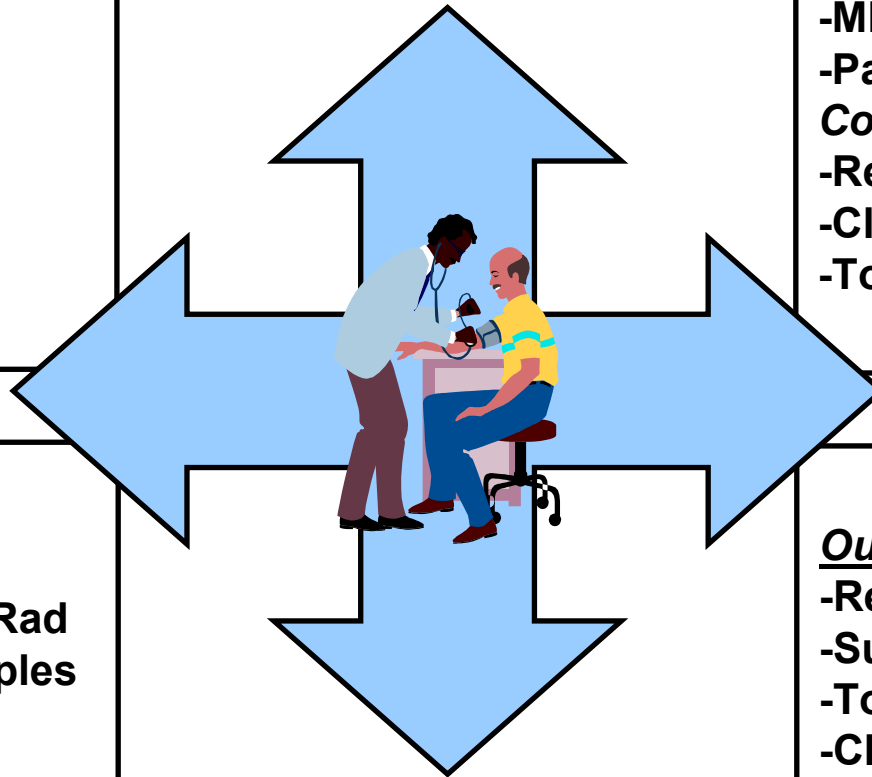
- MDs, RNs, Nutr, SW
- Patients
- Compliance**
- Regulatory
- Clinical Trials
- Toxicity

**Visit**

- Data, Labs, Path, Rad
- Tissue/blood samples
- Decision Support
  - Staging
  - Standard Rx Options
  - Protocol Options

**Outcomes**

- Response to Rx
- Survival
- Toxicity
- Clinical Trials
- Clinical Research
- Patient Satisfaction
- Cost



# **What Can We Accomplish?**

**By Enhancing and Integrating Current Systems, We Can:**

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- ◆ **We can improve data availability for clinicians seeing and treating patients**
- ◆ **We can improve data sharing among clinicians caring for patients - in our own institutions and our community affiliates**
- ◆ **We can improve patient safety**
- ◆ **We can optimize clinical decision making**
- ◆ **We can optimize enrollment on clinical trials**
- ◆ **We can optimize outcomes measurements**
- ◆ **We can measure outcomes and develop strategies to improve care**
- ◆ **We can develop links between genomics and response to treatment, survival, toxicity, etc**
- ◆ **We can track cost - and relation between treatment choices, outcomes and cost**

**Patient::** Doe, Jane **Age:** 57 **MRN:** 236987 **Address:** 14 Maple Ln., Boston, MA 02115

**Allergies:**



## DF/PCC Treatment Decision Module

### Staging Information

- Breast Cancer - primary - Lumpectomy
- Infiltrating Ductal CA - 3.5 cm tumor, grade III/III, ER pos, HER2/neu neg
- LVI negative
- margins negative
- 1/14 axillary nodes +

### Medical Problem List

- Diabetes Mellitus - insulin

### Relevant Laboratory Results

- CBC - WBC = 4.5, Hct 41%, Plts 235,000
- Bili = 0.9, Alk Phos = 78

### Standard Treatment Options

- Breast Radiation (pathology OK)
- Chemotherapy with Cytoxan/Adriamycin x 4, or CMF x 6
- Hormone Therapy with tamoxifen x 5 years

### Protocols

- 99-041 - CA x 4 followed by paclitaxel/doctetaxel, q 1 vs q 3 wks (CALGB 49801)

**Patient::** Doe, Jane **Age:** 57 **MRN:** 236987 **Address:** 14 Maple Ln., Boston, MA 02115

**Allergies:**



## DF/PCC Treatment Order Module

### Prescription Plan

- Due for Cycle #3 of Cytosan - Adriamycin on protocol 99-041
- Labs for the current visit entered by chemo order entry system

### Toxicities

- Patient entered maximum toxicity - via Web - mucositis - grade 3
- Patient entered current toxicity - history - mucositis - grade 1
- Nurse entered maximum toxicity - via LMR mucositis - grade 3
- Nurse entered current toxicity - via LMR - mucositis - grade 2

### Relevant Laboratory Results

- Nadir anc = 350/mm<sup>3</sup> - via CDR
- Visit date anc - 1,240/mm<sup>3</sup> - via CDR

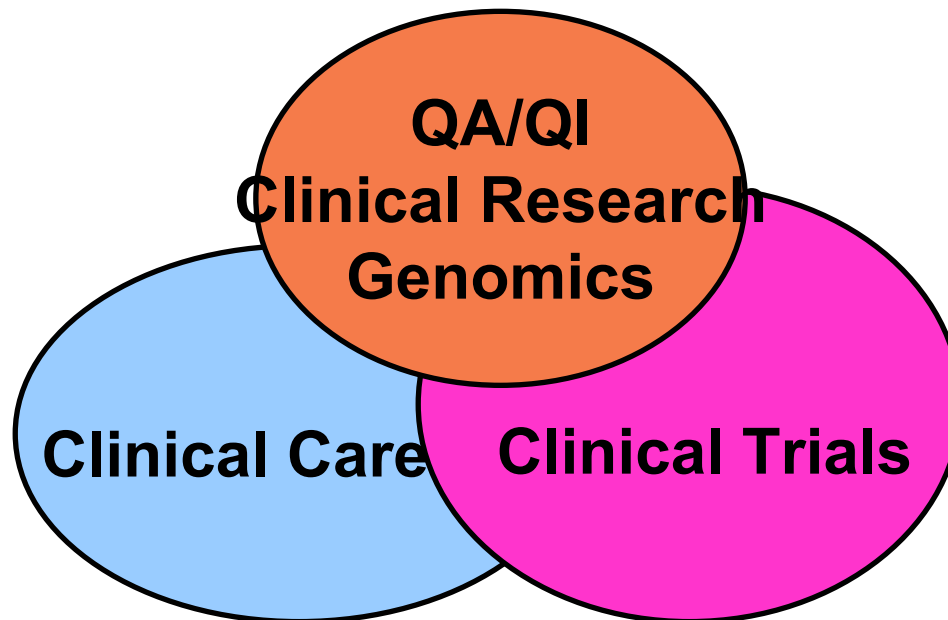
### Order Entry

- Chemo Order Entry system automatically generates correct dose reductions based on toxicity, and orders chemotherapy

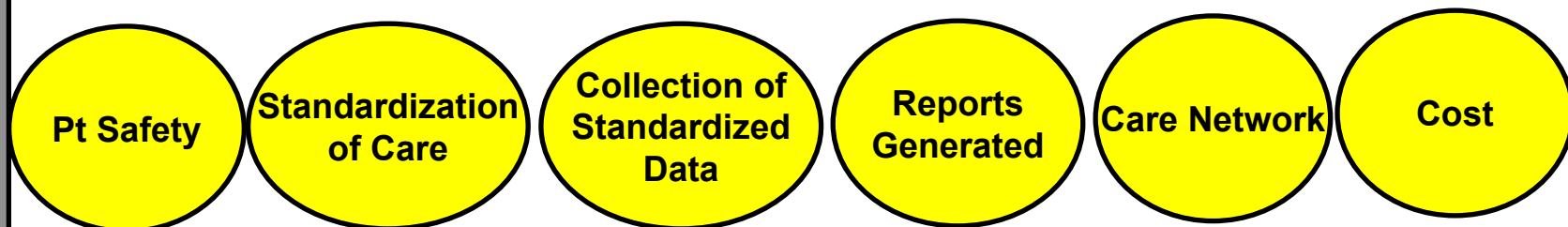
### Outcomes Data Recorded

- LMR generates Adverse Drug Event Reports for Clinical Trial, and appropriate dose reductions of chemo drugs
- Clinical Trials data sheets automatically generated for data manager
- Toxicity data is correlated with genomics data - linking bone marrow suppression with "gene X"

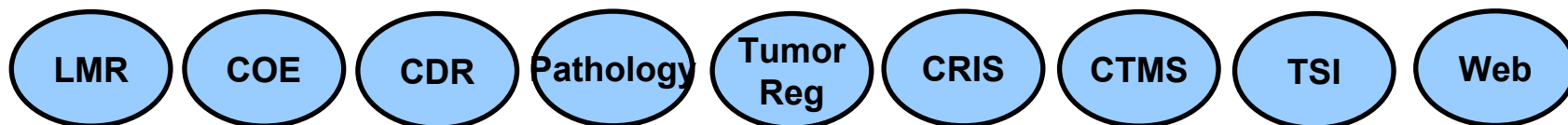
**Key Clinical/Business  
Processes**



**Supporting  
Themes  
and Goals**



**Systems**





# Why is Achieving Benefits so Hard?

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- ◆ Expensive
- ◆ Multi-faceted value
- ◆ Mis-aligned incentives
- ◆ Complicated, stressed workflow
- ◆ Behavior change is hard
- ◆ Politically challenging organizational settings
- ◆ Complex technology
- ◆ Application limitations

# **Obstacles to Implementation of an Electronic Referral Application**

**Gandhi AMIA Proc 2000**

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## **◆ PCP**

- Emailed if their patient is scheduled to see a specialist within 7 days**
- Prompted to enter problem, brief history and specific questions**
- Computerized record information is attached and a referral letter created for the specialist**

## **◆ During a six month pilot:**

- 57% of PCPs used the application**
- PCPs entered data for 36% of referrals**

## **◆ PCPs felt that the system was extra work and did not guarantee a faster and more thorough response from the specialist**

# Critical Success Factors

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- ◆ Leadership that believes, endures and is endemic
- ◆ Open, honest dialogue with the medical staff
- ◆ Data regarding the magnitude of the problems/opportunities and the contribution of the technology
- ◆ A focus on processes
- ◆ Rigorously scrutinized but sufficient budgets
- ◆ Thoughtful political and implementation strategies

# Critical Success Factors

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- ◆ Skilled, experienced implementation teams
- ◆ Applications that are well designed and responsive
- ◆ High performance infrastructure
- ◆ A credible IS organization
- ◆ Stamina
- ◆ Focus